

The CIO and the Medical Informaticist: Alliance for Progress

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To achieve the full potential of information technology, health care institutions must overcome organizational and political barriers that often overshadow scientific and technical barriers. The time has come for an alliance between the Chief Information Officer (CIO) and medical informatics specialists, or informaticists. Organizations that successfully accomplish this alliance will position themselves to take advantage of the enormous potential of information technology to manage today's cost-quality pressures. This article first reviews some of the recent developments in the way health care organizations manage information technology. It then describes the traditional, perhaps the natural state of affairs, in which there may be tension and conflict between medical informaticists and line managers of information systems (IS). Finally, the article makes a case for closer collaboration and cooperation between these groups, and provides a case study that illustrates one example of such an alliance.

MANAGEMENT OF INFORMATION TECHNOLOGY IN MEDICAL CENTERS

The position of CIO was defined in most major industries before the early 1990s, but in health care this position is a more recent development. In mid-1990 only 10 to 15 percent of U.S. hospitals had a CIO, but the number of hospitals deciding to create the position was increasing rapidly [1]. At present (1993), 67% of hospitals have a CIO or someone on staff who fulfills that function, and the position is rapidly becoming more strategic and future oriented [2]. Information systems are increasingly being recognized as providing a strategic advantage [3,4]. At the same time, in order to achieve the potential benefits, many institutions are recognizing a clear need to involve medical staff in the planning, implementation and daily use of these systems [5]. Several mechanisms for accomplishing this involvement are being used, including advisory committees, salaried physicians on the IS staff, and

the creation of the position of chief medical information officer [6].

Traditional Role of Informatics vs. IS Management

Historically there has been a natural discord between people in hospital IS and academicians. Academic medical informatics often attracts medically trained individuals with an affinity for computing technology; they usually also have obtained some formal training in the scientific basis of medical informatics, but seldom have experience or training in the management of information systems. Because new technology often is exciting and very promising, medical informaticists place a high value on keeping up with the state-of-the-art, on individual experimentation and on development of new technologies. They tend to keep scanning the horizon, looking for the newest and greatest technology. In such a fast-moving field it is often possible to experience significant improvements in personal productivity by following the trends closely. To these individuals, the typical CIO appears to be constantly dealing with yesterday's technology, failing to take advantage and sometimes blocking the use of cutting-edge products on which the informaticists implement their prototypes and experiments.

CIO's, for their part, often perceive the academics as people who have great ideas but do not know how to carry them through to a successful implementation. The hospital has to get the bills out and the payables paid, and they fear that academics may sacrifice quality and reliability for unproven theories and uncontrolled experimentation. The CIO may also fear that the informaticists will raise expectations in the medical community without realizing the true cost of implementing those programs. The already backlogged CIO may be having trouble enough guiding one strategy on the campus and fears an academic or clinical counterpart who raises demands for a completely different agenda.

At many institutions, especially academic medical centers, this difference in perspective manifests itself in an organizational structure that encourages rivalry, competition, and in some cases, open hostility. Resources and strategies are fragmented and efforts wasted. Multiple technological directions emerge which are under supported, unconnected, and lack both standardization and momentum.

Federalist Approach to the Politics of Information

Medical centers, especially academic medical centers, are notorious for their politics. Pragmatically defined as a mechanism for resolving questions of resource allocation, politics has a strong influence on information systems. Models of information politics may provide insight into reasons for relative success or failure of integrating information systems in medical centers. Davenport[7] identifies five models of information politics, including monarchy, feudalism, technocratic utopianism, anarchy, and federalism. Federalism, characterized by "the use of negotiation to bring potentially competing and non-cooperating parties together,"[7] is one of the more effective models, and may help in the development of an alliance between IS and informaticists.

Rationale for Alliance

There is clearly a benefit to an institution to having a coordinated and cooperative IS effort that includes a developmental and experimental component. The CIO can bring management discipline to the complex organization, while the informaticist can work with physician and nursing groups to stimulate effective user input. In any alliance, it is common goals and objectives that provide the catalyst for its formation and perpetuation. Now more than ever, there are common goals between informaticists and IS managers. The effective use of information can truly be said to be of strategic importance for an institution [2,3,4,8]. In order to achieve the many strategic benefits of IS, the strengths and skills of each party in the alliance are needed.

Analogous Alliances in Health Care Management

Other hospital domains often have this type of alliance, and they can provide an analogous model for guiding expectations about roles and responsibilities. For example, the Chief of Staff and the hospital Chief Operating Officer ordinarily would work together to coordinate activities of the physicians and hospital administration. Another example comes from the clinical laboratory, where the pathologist and the laboratory administrative

director (often in the hospital line) work in tandem. The medical director of a clinical laboratory ordinarily does far more than merely provide clinical guidance and consultation to the clinicians who send specimens to the lab. Most decisions affecting the laboratory are within the scope of joint decision making, from decisions about reagent selection, service levels, technologist staffing, and quality improvement to issues of strategic direction and medical relevance.

Just as there is variability in the degree to which medical directors of laboratories are involved in operations and management, so there will be variability in the tasks primarily handled by the CIO and the informaticist, depending on background, capabilities, and needs. However, it is clear that as information systems capture more clinical data and are used more by physicians, the need for the informaticist will increase. By analogy with some approaches to clinical laboratory management, this need can clearly be met by a collaborative alliance without requiring strictly hierarchical reporting relationships between the CIO and the informaticist.

Role of Experimentation in IS Departments

Experimentation is healthy, and if the CIO and informaticist come to an understanding and review it regularly, they can readily manage concerns about fragmented technological direction, overblown expectations, and difficult implementation and support. Some argue that the hospital information system should be the informaticist's research laboratory. Properly conceived and executed, this can be a powerful idea. It is not unreasonable to suggest that a significant applied research effort with feedback that influences the implementation may be essential for success of any electronic patient record system. The standardization and capacity of computer systems have advanced to the point where the technological choices required by the IS requirements should seldom present substantial barriers to successfully carrying out experimentation. Expectations can be managed by clearly indicating that a project is experimental, and by exercising careful restraint in making statements about possible timelines for implementation or delivery of systems. Controlled and limited experimentation clearly is a healthy and important component of a plan for information systems. The CIO can be the shaper of engineering development and provide an "alpha" implementation site for new technologies generated by the creative minds of the academic community.

CASE STUDY

As an institutional recipient of a grant for Integrated Academic Information Management Systems (IAIMS) beginning in 1989, OHSU has been very active in developing its information technology infrastructure. In its initial organization, the IAIMS effort brought together under one administrative structure much of the information technology on campus, including the library, computer systems and networks, telecommunications, and several other related departments. This organization is known as the Biomedical Information Communication Center (BICC).

The BICC did not take direct responsibility for the hospital information systems division (HISD). Organizationally, BICC and HISD were separate and distinct up to the level of the IAIMS director and the hospital CEO. They also took separate technological directions. From a management perspective, this was acceptable for a time, since individual projects on both sides could be carried out in relative isolation from the complications of a university-wide agenda. As time went on, however, it became increasingly clear that closer coordination and cooperation would be required. Users of information systems, frequently crossing organizational boundaries, want integration, yet our management structure encouraged fragmentation.

At the beginning of the IAIMS effort there was no campus-wide local area network (LAN). In addressing this problem, two very different LAN architectures emerged, with HISD choosing token ring, IPX, Novell, and IBM PC workstations, while BICC chose ethernet, TCP/IP, Starlan, and a variety of workstations from PC clones and Macintoshes to Unix workstations. Different electronic mail systems were installed, and different user support mechanisms were put in place.

The BICC began some experimental projects with clinical information system implications. One project explored the use of object-oriented software for physician workstations, and another developed approaches to integrating electronic patient information from diverse sources. These projects raised some of the concerns mentioned above with respect to multiple technological directions, support, and user expectations.

Beginning of an alliance

Several actions were taken to increase collaboration and cooperation. The HISD director led the development of a strategic plan for clinical information systems, and the informaticists provided assistance and critique in the formation of the plan. A clinical workstation was included as an important component of the plan (see Figure 1).

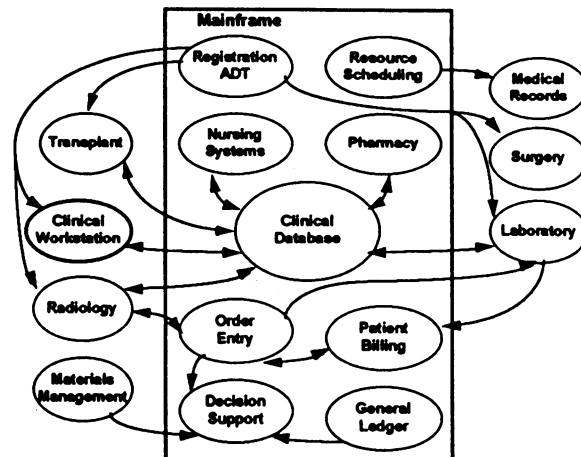


Figure 1. Clinical Information Systems and Interfaces

The BICC clinical workstation effort was recognized as a development of interest to clinicians, and efforts were begun to permit re-hosting the software to the workstation platform installed in the hospital, while spinning out a development group that could potentially commercialize it. An electronic bridge was installed between the two LANs, but it was recognized that this could not meet the long-term needs of the campus for integration of the network infrastructure. The HISD director accepted an invitation to participate in teaching medical informatics. One of the informaticists accepted a role in HISD as physician liaison.

At this point, departure of one of the authors (JRB), the initial IAIMS director, led to a structural reorganization that placed another of the authors (JDE), initially the HISD director, in the position of managing both hospital and university information systems and eventually led to him being designated the CIO. At the same time, the other author (KAS) took responsibility for the IAIMS project and the academic medical informatics program, eventually leading to him being designated the Chief Medical Information Officer. The CIO and CMIO now have offices in the same suite, report to the same Vice

Presidents, meet regularly to discuss planning and implementation issues, and work in tandem to help create positive energy for information systems to support the institution.

Current directions

In an era marked by rapidly shrinking budgets and even more rapidly advancing technology, it has become clear that unifying the campus network could better meet the needs of users and at the same time decrease administrative burden and costs. The CIO and CMIO jointly developed a plan to unify the LAN infrastructure around a common backbone (in this case, a 16 megabit token ring) with both ethernet and token ring sub-nets. Host computers that run various administrative, clinical, teaching or research applications will be equally accessible regardless of where the host is located on the network. A single campus electronic mail system is being implemented, and the plan calls for a single network operating system for PC compatibles, while actively supporting non-PC workstations. It will also lead to integration of a campus help desk that serves users of both hospital and university applications.

In the area of clinical information systems, a project to develop a longitudinal electronic patient record has been initiated. This project will involve clinicians in a very direct way and will require very close collaboration between IS staff, informaticists, and clinicians.

The clinical workstation initially prototyped in BICC has become a key strategic initiative for the medical center. It has been re-hosted to networked PC-compatible workstations running Microsoft Windows, and it is installed in a growing number of physician offices and three multi-user clinical sites. It currently provides convenient graphical user interface to clinical laboratory results, as well as a suite of productivity applications and terminal emulation connection to other clinical systems. The developers are expanding the breadth of clinical information accessible through the workstation. Informaticists still actively solicit candid feedback from clinicians about the strengths and weaknesses of the workstation, and work closely with developers and IS staff to improve its functional capabilities.

User acceptance has grown dramatically as their recommended enhancements have been implemented.

SUMMARY

It is possible to form an alliance between academics in medical informatics and CIO's, taking a federalist approach to information politics and a matrix approach to IS management. In order for the alliance to work, strong and visionary leadership is required from both the CIO and the informaticist. At the same time, people need to check their egos at the door. The future of healthcare information systems requires this sort of collaboration.

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